MULTIMEDIA UNIVERSITY

STUDENT IDENTIFICATION NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2018/2019

BBM3034 – BUSINESS MODELLING AND SIMULATION

(All section/Group)

11 MARCH 2019
2.30 pm – 4.30 pm
(2 hours)

INSTRUCTION TO STUDENT

1. This question paper consists of **THREE (3)** pages, excluding the cover page, with **FOUR (4)** structured questions.
2. Marks are shown at the end of each question.
3. Set up Question 2's production model in Worksheet 1. **Attach your answer in Worksheet 1 to the answer booklet.**
4. Write all your answers in the answer booklet provided.

Answer all questions.

Question One

(a) A model is a simplified representation of a system. Briefly differentiate, with an example each, between a static and a dynamic system. (4 marks)

(b) Explain the three usage of modelling and simulation applications. (6 marks)

(c) Illustrate three types of social science business modelling and simulation. (9 marks)

(d) Differentiate between categorical and numerical data in a business model. (6 marks)

(Total: 25 marks)

Question Two

Read the problem below and answer the following questions.

TIKUS is a company that produces wireless mouse, namely T1 and T2, respectively. The unit price for T1 is RM25 and T2 is RM35. TIKUS estimated its monthly demand for the www.lazada.com.my market for T1 is 550 units and 380 units, respectively. TIKUS' operation manager informs you that in any typical month, it requires 2 units of materials to produce T1 and 3 units of materials to make T2 for the www.lazada.com.my market. Each unit of materials costs RM5 and the funds available to buy materials for production to meet www.lazada.com.my market is RM2,000 per month.

The labour cost to produce one T1 requires 2 labour hours of assembling, quality checking and packaging. The labour cost to produce one T2 requires 4 labour hours of assembling, quality checking and packaging. The labour cost of assembling, quality checking and packaging is RM4 an hour respectively. The amount of monthly labour hours available for TIKUS to produce the wireless mouse is 2,400 hours for assembling, quality checking and packaging. Assuming that TIKUS does not hold any inventory, it wants to know how to optimise its production and maximise its profits by selling its wireless mouse online at www.lazada.com.my.

Based on the problem above, answer the following questions:-

(a) Find the mathematical objective function of this problem. (2 marks)

(b) Determine all the constraints to this problem. (8 marks)

(c) Calculate the material and labour cost for the production of one unit of T1 and one unit of T2. (6 marks)

(d) If the optimum solution is to produce 550 units of T1 and 300 units of T2, set up the problem on Worksheet 1 (in page 3). In Worksheet 1, determine the total material used, total labour cost and the total profits for the production of T1 and T2. Submit your answer by attaching Worksheet 1 to your answer booklet. (9 marks)

(Total: 25 marks)

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Question Three

(a) Assume you want to take out a RM300,000 loan on a 20-year fixed loan (mortgage) with end-of-month payments. The annual rate of interest is 6 percent. Twenty years from now, you need to make an ending balloon payment of RM30,000. Present how you can use Simplex Linear Programming to determine the amount of money you need to pay off your loan. (7 marks)

(b) Monte Carlo analysis is one of the simulation methods based on the range of possible outcomes for a number of scenarios. Explain the steps required to run a simulation model. (12 marks)

(c) Explain the meaning of validating a model. (6 marks)

(Total: 25 marks)

Question Four

A small supermarket is trying to determine how many copies of The Edge (weekly financial newspaper) it should order each week. The owner believes the demand for The Edge is governed by the following discrete random variable in Table 1.

Table 1 : Demand for The Edge

Demand	Probability
15	0.10
20	0.20
25	0.30
30	0.25
35	0.15

The supermarket pays RM2.00 for each copy of The Edge and for RM4.00 each. Each unsold copy can be returned for RM0.50.

(a) Why you would run =RAND() in this problem? (2 marks)

(b) Determine how you would set up the probability of demand for The Edge as a decision-making tool to help solve this supermarket problem. (7 marks)

(c) Infer how you would apply Monte Carlo simulation as a decision-making tool to help solve this supermarket problem. (12 marks)

(d) Suppose the supermarket order 30 copies of The Edge, and the random variable generated is 0.3811, what is the total profit of the supermarket? (4 marks)

(Total: 25 marks)

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Student ID No :-_____

Worksheet 1

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